

## Comparative Study of Skinfold Thickness of Adolescent Mahishya Girls of Howrah District, West Bengal

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**ABSTRACT** Amount of subcutaneous fat has particular role in adolescent growth. Extensive work on skinfold thickness of adolescent girls of our country is still lacking. The present study reports biceps and triceps skinfold thicknesses of 194 girls aged 11 through 15 years, belonging to the Mahishya caste of the Bengali Hindu society. The data have been compared with other studies from Howrah, Calcutta and Delhi. From comparison it appears that all the samples differ considerably, in both biceps and triceps skinfolds thicknesses.

### INTRODUCTION

Skinfold thickness may be considered as an index of caloric reserve was shown by Garn (1962) and Jelliffe (1966). A positive relation between economic status and skinfold thickness was obtained in girls from Calcutta by Sen (1969), which indicates the importance of nutrition on the skinfold thickness. This relation of nutrition with skinfold thickness in triceps region has been more clearly expressed in the work on a tribal population during harvest and lean seasons by Roy (1978). Besides, triceps skinfold thickness is considered to be more hereditary and shows more ethnic and sexual differences (Albrink and Meigs, 1964) and is thus a more dependable parameter to compare between populations.

Not much work has been done on the amount of subcutaneous fat among the girls of our country, particularly during adolescence. And thus, the role of heredity, nutrition and other environmental factors, in the amount of subcutaneous fat among the adolescent girls of our country is yet to be clearly understood.

This study attempts to measure the subcutaneous fat at biceps and triceps regions among the girls of 11 to 15 years of an endogamous

Bengali caste group (Mahishya) of Howrah city, West Bengal, and the sample is compared with other populations.

### MATERIAL AND METHOD

The city of Howrah is situated on the west bank of the river Hooghly opposite to Calcutta and is well known as the most industrialised city of India. From a secondary school in the central part of the city 194 girls of the Mahishya caste were measured for biceps and triceps skinfold thicknesses. The measurements were taken during 1984-1985.

The measurements were done following the IBP recommendations (Weiner and Lourie, 1981), the age of the individual subject was ascertained through interview and verified form school records as well as birth records.

Data on Mahishya girls of rural Howrah and Non-Mahishya girls of urban Howrah, collected by the same authors and compared with published data on Punjabi and Bengali girls of Delhi and Calcutta city.

### RESULTS

**Biceps Skinfold** : The means of biceps skinfold thickness of the present sample of

Table 1 : Absolutes and log values of the Urban Mahishya girls

Age (in year)	n	Biceps			Triceps		
		$\bar{X} \pm SE$	SD	Log $\pm SE$	$\bar{X} \pm SE$	SD	Log $\pm SE$
11	47	4.81 $\pm$ 0.26	1.76	0.670 $\pm$ 0.02	10.91 $\pm$ 0.51	3.50	1.015 $\pm$ 0.02
12	51	5.19 $\pm$ 0.21	1.53	0.695 $\pm$ 0.02	11.09 $\pm$ 0.48	3.46	1.023 $\pm$ 0.02
13	32	5.57 $\pm$ 0.31	1.76	0.725 $\pm$ 0.02	12.60 $\pm$ 0.92	5.22	1.069 $\pm$ 0.03
14	37	6.43 $\pm$ 0.44	2.67	0.769 $\pm$ 0.03	14.01 $\pm$ 0.87	5.30	1.105 $\pm$ 0.03
15	27	7.55 $\pm$ 0.59	3.08	0.839 $\pm$ 0.04	16.64 $\pm$ 1.09	5.66	1.195 $\pm$ .03

Urban Mahishya girls show a steady increase from 11 to 15 years (Table 1 and Figs. 1,2 and 3), the rate of increase being highest during 14-15 years (Table 4).

In the case of Non-Mahishya girl of the same area the mean biceps skinfold thickness also exhibits a continuous increase through the ages with highest rate of increment during 13-14 years. The Non-Mahishya sample differs from the Mahishya sample both in absolute values and in progression. The progression agrees only during 13-14 years.

The Rural Mahishya sample shows a general uniformity in pattern of development with the Urban counterpart, though with lower mean values (Table 2). But during 14-15 years the Rural sample remains nearly stable while the Urban sample represents highest rate of development.

Punjabi girls from Delhi (labeled as Delhi 2) showing higher mean values at all ages compared to all the samples from Howrah district, exhibits continuous decrease in values through the ages, the rate of decrease being maximum during 14-15 years (Table 2, Fig. 1)

Table 2 : Comparison of mean ( $\bar{X}$ ) biceps skinfold thickness between urban Mahishya and other samples (mm)

Age (in year)	Mahishya	Non-Mahishya		Punjabi
	Urban	Rural	Urban	Delhi-2
11	4.81	3.61	5.02	9.70
12	5.19	3.91	5.24	9.48
13	5.57	4.34	5.32	9.08
14	6.43	5.02	6.17	8.98
15	7.55	5.07	6.34	7.83

The reason for such a reverse pattern is not understood.

*Triceps Skinfold:* In the case of triceps skinfold thickness the present sample of Urban Mahishya girls shows a steady increase during 12-14 years which is more marked in the subsequent year. The highest rate of increment is noticed during 14-15 years (Table 2, Fig. 2).

The Urban Mahishya and Non-Mahishya samples agree only during 13-15 years. On the other hand, the Rural and Urban Mahishya samples show similar pattern of progression in absolute values. This difference may have nutritional/environmental implications.

The present sample and a sample from Calcutta (Sen, 1969) show a general uniformity in the development of triceps skinfold, i.e., a steady increase from 12-14 years which is followed by maximum increase in Mahishya, but is stabilised in Calcutta girls during 14-15 years. This similarity in pattern of development (upto 14 years), may possibly be due to similarity in general environment of two adjacent cities.

Two Punjabi samples from Delhi do not, however, show any uniformity in the pattern of development of triceps skinfold thickness, and thus in fat patterning in general, among adolescent girls. The sample from middle income families (Delhi-1) shows a gradual increase in fat after 12 years whereas the affluent families (Delhi-2) gradually decreases after 12 years. In the case of the affluent sample, a marked increase is found during 11-12 years which in the case of middle income families shows a more or less stable condition. Such a difference

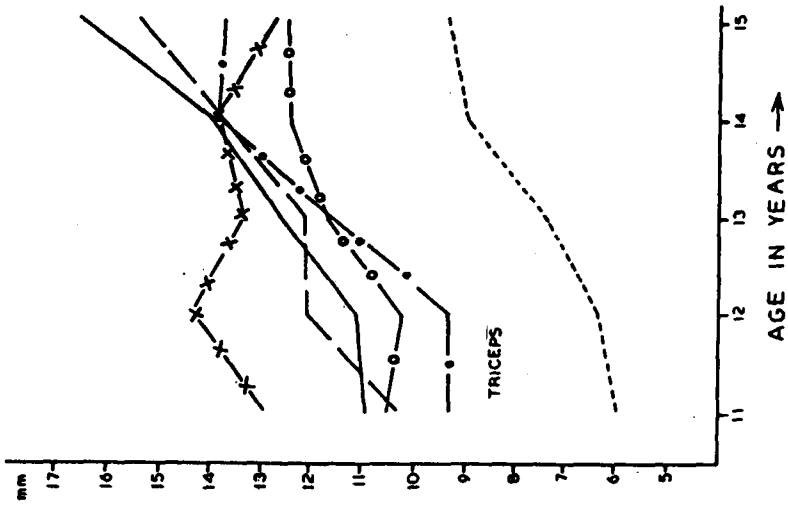


Fig. 2

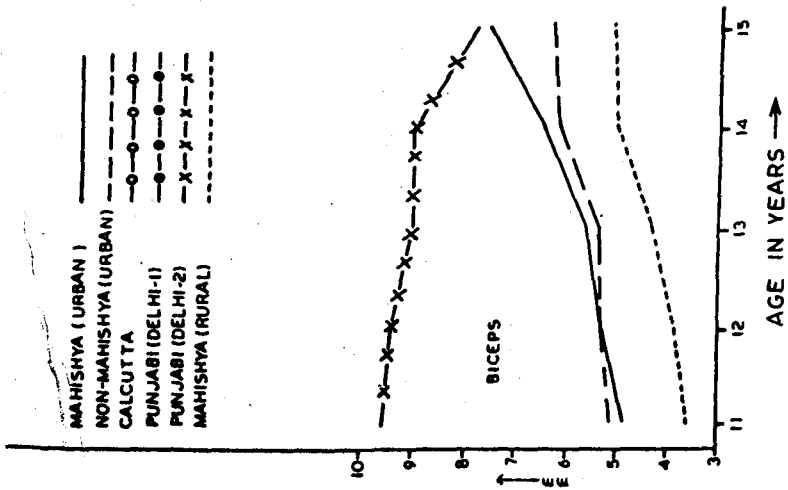


Fig. 1

Table 3 : Comparison of mean triceps skinfold thickness between Urban Mahishya and other samples (mm)

Age (in year)	Mahishya		Non-Mahishya	Punjabi		Calcutta
	Urban	Rural	Urban	Delhi-1	Delhi-2	
11	10.19	5.95	10.28	9.3	12.90	10.5
12	11.09	6.37	12.06	9.3	14.34	10.2
13	12.60	7.35	12.14	11.7	13.35	11.7
14	14.01	9.01	13.78	13.9	13.85	12.4
15	16.64	9.35	15.40	13.8	12.70	12.5

Table 4 : Comparison of rates of increment per year of biceps and triceps skinfold thicknesses of different samples

Age (in year)	Position	Rates of increment per year (mm)					Calcutta
		Mahishya		Non-Mahishya	Punjabi		
		Rural	Urban	Urban	Delhi-1	Delhi-2	
11-12	Biceps	0.083	0.079	0.044	-0.023	x	x
	Triceps	0.071	0.016	0.173	0.000	0.112*	-0.029
12-13	Biceps	0.110	0.073	0.015	-0.042	x	x
	Triceps	0.154	0.136	0.007	0.258*	0.069	0.147*
13-14	Biceps	0.157*	0.154	0.160*	-0.099	x	x
	Triceps	0.226*	0.112	0.135*	0.188	0.037	0.060
14-15	Biceps	0.009	0.174*	0.028	-0.128	x	x
	Triceps	0.038	0.188*	0.118	-0.007	-0.083	0.008

\*indicates highest rate

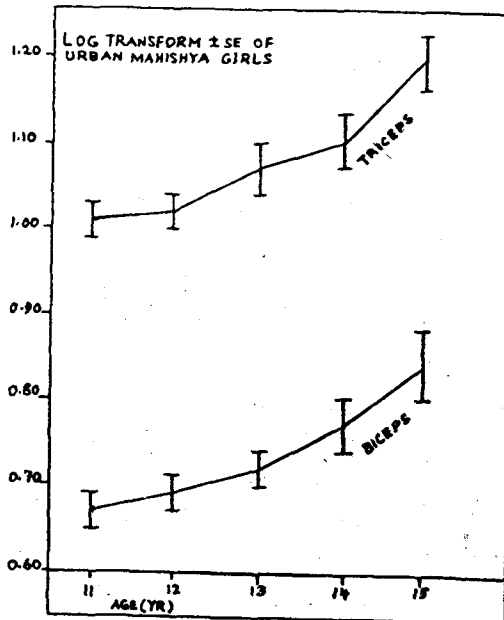


Fig. 3

between two samples from the same ethnic group and from the same environment, a decreasing curve in the case of the economically better-off section, remains apparently inexplicable.

### DISCUSSION

In the case of biceps skinfold thicknesses the Urban Mahishya sample shows close resemblance in pattern with the Urban Non-Mahishya sample from the same area and similar economic condition, from which it does not appear that the factor of ethnicity has any appreciable role in determining, at least, the biceps skinfold thickness. The Rural Mahishya sample also shows a general conformity in pattern with lesser absolute values, with the Urban Mahishya sample upto the age of 14 years. This difference may be interpreted as due to difference in nutrition/environment. The Punjabi sample (Delhi-2) displays a fully reverse picture to the Mahishya. Non-Mahishya sample of Howrah shows higher values at 11 years and gradually decreasing values till 15 years.

In the case of triceps skinfold thickness, a considerable disagreement is noticed between the samples, although the Mahishya and Non-Mahishya samples from Urban Howrah, one sample of mixed ethnicity from Calcutta, and another of Punjabi girls (Delhi-1), form more or less one cluster. The Rural Mahishyas showing a general uniformity in pattern has much less

absolute values. The two Punjabi samples differ most notably, and their difference is apparently not understandable as the more affluent sample shows a decreasing pattern through all the ages.

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